<u>**D R A F T**</u>

**MINISTRY OF FINANCE
INFORMATION TECHNOLOGY PLAN
1998/1999**

Building Equity and Economic Participation (BEEP) Project
Contract No. 504-0107-C-00-6201-00

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                           July 1998

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INTRODUCTION

As part of the drive for greater efficiency and better resource management within the Ministry of Finance, it is proposed that an Information Technology Plan be used to streamline and prioritise the computerisation process.

This document presents the overall concept and approach for the development and implementation of an Information Technology Plan at the Ministry of Finance. The proposed solutions and related issues in this document, which are based on a series of discussions with relevant staff and the examination of current data outputs/inputs, are addressed from a data flow management and computerised procedures perspective. It is a comprehensive document detailing the following.

- Overview of the existing environment.
- Concept of a proposed Management Information System.
- The system architecture required to support the proposed Management Information System.
- The data requirements for the proposed Management Information System.
- Brief Analysis of current informatic capacity
- Proposed plan of implementation.
- The Overall feasibility of the system proposed

The overall goal is to implement a management information system which will facilitate easy data inputs, produce timely reports and improve accountability. The proposed system will be written using industry standard, modern computer languages and database techniques, and designed to be easy to maintain and build upon as the needs and the skills base improves within the Ministry of Finance.

Background

The Ministry of Finance, in co-operation with The Building Equity and Economic Participation (BEEP) project has undertaken the development of the Information Technology strategic plan to streamline the informatic processes of the Ministry of Finance. It is important to note that while the terms of reference indicate that the Information Technology Plan was to be developed for the Ministry of Finance as a whole, The BEEP Chief-of-Party, instructed however, that the plan focus on the following division/units:

- Macroeconomic Unit
- Office of the Budget
- Project Cycle Division
- Enterprise Monitoring
- Debt Management Division

The new requirement of the Information Technology Plan therefore was to analyze the above mentioned divisions/units to ascertain the following:

- The information collected and maintained by each division.
- The reports generated by each division
- The informatic capacity of each division
- The data linkages between each division and externally (i.e. the Bank of Guyana, The Statistical Bureau, Customs and Excise Department and the Inland Revenue Department.

The objective of this exercise is to formalize the data requirements and related linkages and also to develop the overall concept of a Macroeconomic Data Management System to satisfy the informatic needs of the selected divisions. The system architecture to support the proposed information system and the plan of implementation is also provided within this document.

The document therefore outlines the following:

Environmental Analysis: *An examination of the current technical and operational environment within the evaluated divisions/agencies.*

Information System Concept: *Design and Functional Specifications of the proposed information system, the base data requirements, the technical*

architecture required, the responsibility of the users

.
Implementation Plan: *A proposed schedule of implementation, staffing and related costs.*

Feasibility: *A concise analysis of the feasibility of the proposed system.*

The document is targeted at managers. Knowledge of computer systems, while helpful, is not a prerequisite.

SECTION I: Analysis of the Current Environment

This section of the document provides an overview of the information maintained by the selected divisions. The data linkages between the divisions and also the external agencies (i.e. The Bank of Guyana, The Inland Revenue Department, Customs & Excise Department, The Bureau of Statistics) are also discussed and illustrated. Please note that the data linkages examined in this section pertain only to the divisions and external agencies selected for evaluation.

I.1   *Overview*

The collection and maintenance of data is still primarily a manual process in the divisions/units evaluated. Only the Debt Management and Project Cycle divisions have database management systems (DBMS) which they use to store and manipulate data. All other records are maintained in hard copy files. Commercial packages such as Microsoft Excel, Microsoft Word and WordPerfect are used primarily to prepare reports for dissemination.

I.2.   *Information Linkages with Other Division/Agencies*

The following pages illustrate the data linkages between the selected divisions and external agencies. Please note that all linkages identified pertain only to the divisions and external agencies evaluated. Many other linkages were identified, but they were not outlined because they do not pertain directly to the solutions provided in this document.

Division: Debt Management Division (DMD)

Mandate: This division is the central agency responsible for recording, monitoring and assisting with the management of all public and publicly guaranteed external debt (Central government, Bank of Guyana and parastatal debt)

The following divisions and/or external agencies receive and process information (data outputs) based on the data inputs produced by this division

Division/Agencies	Data Inputs Provided
Macroeconomic Unit	Multilateral & Bilateral Debt Statistics, Monthly projected and actual debt service payments, Quarterly Debt Stock Information, Debt Payment Savings, Guyana's External Debt, Private Sector Debt
Bureau of Statistics	Scheduled Debt Profiles, Debt Service Payments Data, External Debt Data, Outstanding Debt Stock Data
Bank of Guyana	Debt Service Payments Data, External Debt Transactions, Loan Disbursements, Private Sector Debt Data, Domestic Debt Data, Multilateral and Bilateral Debt Statistics, Monthly projected and actual debt service payments, External Debt Portfolio Data, Annual Debt Management Data, Private Sector Debt Data,

The following divisions and/or agencies provide information (data inputs) for this division's outputs

Division/Agencies	Data Inputs
Macroeconomic Unit	External Debt Portfolio Data, Analysis on Guyana's external debt. Macroeconomic statistics
Enterprise Monitoring Division	Data on Public Corporation Debt
Bureau of Statistics	External Debt Transactions, External Debt Analysis, External Debt Portfolio Data
Bank of Guyana	Projected debt Service Payments, Total External Debt Stock Information, Disbursements Information, Summary of Debenture Interest Payments, Central Government Bonded Debt by Holders, Treasury Bills by Holders (Face Value, Cost, Interest), Domestic Financing

Notes:

- There is a debt information system already in use (CS-DRMS). This application currently operates on the SCO-UNIX platform. Staff in the division, however, has expressed concerns about the inflexibility of the reporting functions of the system. The recent update of this system (CS-DRMS Ver. 7.1) has not addressed these concerns. Data is currently exported from CS-DRMS and appended into off the shelf packages (i.e. Excel, Lotus 123) so as to generate the required reports.

Division: Enterprise Monitoring Division

Mandate: This division monitors the performance of state-owned enterprises for the Ministry of Finance and the IMF. The information collected is primarily overall financial operations and cash flows.

The following divisions and/or external agencies receive and process information (data outputs) based on the data inputs produced by this division

Division/Agencies	Data Inputs Provided
Macroeconomic Unit	Rice Exports Data, Bauxite Company Operations
Bank of Guyana	Financial Operations of Public Corporations, Cash Flows
Office of the Budget	Consolidated Operations Reports, Cash Flows, Corporation Tax and Dividend Payments
Debt Management Division	Schedule of Public Corporation Debt
Project Cycle Division	Projected Public Corporation Expenditure, Actual Revenue and Expenditure, Projected Budget from Public Corporations

The following divisions and/or agencies provide information (data inputs) for this division's outputs

Division/Agencies	Data Inputs
Project Cycle Division	Releases to Public Corporations, Adjusted Budget Estimates for Public Corporations

Division: Project Cycle Division

Mandate: This division manages all donor-funded projects. Projects are monitored according to financing, compliance and overall progress.

The following divisions and/or external agencies receive and process information (data outputs) based on the data inputs produced by this division

Division/Agencies	Data Inputs Provided
Macroeconomic Unit	PSIP Performance, Project Execution

	and Implementation Information, Projections on Foreign and Local Inflow Requirements (based on Projects currently in execution or about to be implemented.
Bank of Guyana	Projected and Actual expenditures per project within the PSIP, Total Capital Expenditure
Office of the Budget	Requests for Releases, Capital Expenditure, PSIP information (Actual total expenditures and expenditures by Donor Agencies)
Bureau of Statistics	Capital Expenditure classified by Economic Sectors
Enterprise Monitoring Unit	Actual Releases to Public Corporations, Adjusted Budget Estimates for the Public Corporations

The following divisions and/or agencies provide information (data inputs) for this division's outputs

Division/Agencies	Data Inputs
Enterprise Monitoring Unit	Projected and actual Public Corporation expenditure, Projected Budget Estimates for Public Corporations

Notes:

- There is a project management database currently in operation in the project cycle division. Discussions with staff and an independent evaluation indicated however that it is not user-friendly and information is not easily accessible.

There is currently no computerised information maintained on the activities of a project during execution. It is recommended that this be implemented so as to provide a complete project profile.

Division: Office of the Budget

Mandate: This division manages the public finances through preparing annual estimates of revenue and expenditure for National Assembly approval, and monitoring such revenue and expenditure through the fiscal year

The following divisions and/or external agencies receive and process information (data outputs) based on the data inputs produced by this division

Division/Agencies	Data Inputs Provided
Bank of Guyana	Projection of Central Government Cash Flows Projected and Actual Current and Capital Revenue, Projected and Actual Current and Capital Expenditure
Bureau of Statistics	Current Revenues and Expenditures, Public Sector Wage Bill, No. of Persons employed by the public sector
Enterprise Monitoring Unit	Actual Releases to Public Corporations, Adjusted Budget Estimates for the Public Corporations

The following divisions and/or agencies provide information (data inputs) for this division's outputs

Division/Agencies	Data Inputs
Customs & Excise Department	Tax Revenue (i.e. Income Tax, Property Tax, Production & Consumption Tax)
Enterprise Monitoring	Corporation Tax & Dividend Payments
Debt Management Division	External Grants(Project, Cash and Commodity Assistance)
Project Cycle Division	Capital Expenditure Data
Inland Revenue	Tax Revenue (Import & Export Duties, Travel Tax, Other Taxes on International Trade Transactions)

Division/Unit: The Macroeconomic Unit

Mandate: This unit provides economic analysis and research for the Ministry of Finance.

To fulfil its overall mandate, the Macroeconomic Unit requests and receives all information required from the other selected divisions. Its primary function is to manipulate and extract all data necessary for its research, analysis and development of policy objectives for the Ministry of Finance.   The following is an example of the information this unit analyses.

Description of Information	Source(s)
Operational Revenue	Office of the Budget
Import & Export Tax Revenues	Office of the Budget, Customs & Excise Department
Import & Export Tax Revenues by Commodity	Customs & Excise Dept. via MISU
Import & Export Tax Revenues by Economic Sector	Customs & Excise Dept. via MISU
Income Tax Revenues	Office of the Budget, IRD
Labor Market Information	Bureau of Statistics
Rice Export Information	Enterprise Monitoring Division
Public Corporation Debt	Enterprise Monitoring Division
Capital Expenditure	Office of the Budget, Project Cycle Division
Bilateral & Multilateral Debt Information	Debt Management Division

I.3 Overview *of the Current Environment*

Technical Environment

The computer hardware that exists in the divisions/units evaluated range from the very latest in technology to the very obsolete. There is a three (3) workstation network currently being implemented in the Debt Management Division and the Project Cycle Division has access to the Local Area Network (LAN) in operation in the State Planning Secretariat. The Enterprise Monitoring Division and the Macroeconomic Unit has access to one (1) computer each. The Office of the Budget has access to computers provided by MISU and also the Guyana Economic Management Programme (GEM-P).

The current environment reflects an implementation that was piecemeal and rather localised within the context of overall system integration in the Ministry of Finance. It is assumed this will change when the overall restructuring has been completed and the current Local Area Network (LAN) has been extended.

Software Systems and Support Staffing

There are no comprehensive management information systems currently in operation in any of the divisions/units evaluated. The majority of outputs generated are done using spreadsheet applications like MS-Excel and Lotus 123 and word-processing packages like MS-Word and Word-perfect.

The Debt Management Division is currently using the Commonwealth Secretariat Debt Records Management System (CS-DRMS, Version 7.1). While this system seems to have many of the functions required by the division, it has major weaknesses in terms of its reporting capabilities. As a result, information has to be exported to commercial packages such Microsoft Excel and Lotus 123 in order to manipulate the data (again) and then generate the required reports. Needless to say this is a tedious process.

The Projects Cycle Division stores all project profiles in an Alpha 4 database management system. This however is used primarily for data storage. Any reports requested have to be designed and built on most occasions. The database is also incomplete in the sense that issues pertaining to project performance (i.e. Status reports, potential problems, etc.) are not recorded. It would also be useful to have a module tracking the disbursement schedules per project. This system more than all the others, needs to be defined and eventually developed into a responsive, user-friendly management information system.

The Office of the Budget processes all relevant data with the assistance of the consultants under the Guyana Economic Management Program (GEM-P). To date this office still does not have a completed Budget Management System. Discussions with relevant staff indicate an executive search is now being conducted to find a budgeting and accounting system geared for the needs of this division.

With a few exceptions, the skills level in the divisions does not go beyond the use of Word-processing, spreadsheet applications and data entry when and where required. While this might be sufficient in most instances, it becomes a serious concern when it comes to the operation of management information systems. Training therefore is a major component of any move to high-end management information solutions.

General Operations

Discussions and observations clearly indicate that the evaluated divisions and external agencies generate a substantial amount of information. These entities provide this information to each other either by request or on a scheduled basis. The method of information management however, is simply not sustainable over the long term. This is because of the following:

- All data is localised within the individual divisions/agencies. The overall informatic capacity is therefore reduced because data resides in too many different locations.
- There are no standard data formats or guidelines for data storage.
- Every division would have individual views on timeliness and accuracy. This sometimes results in the perception real or imagined that the provision of data is either late or in some cases inaccurate.
- Dissatisfaction with data provided may cause some entities to locate other data sources thus compromising any established data collection procedures in existence.

There is also no evidence of any policy mandate or directive that applies specifically to the dissemination of information within the divisions and the external agencies. Each division or agency simply sends information to each other without any structured guidelines or established formats. The end result of this is that there is a tremendous amount of duplication in the information provided.

SECTION II: ***The Proposed Information Management System***

This section of the document provides a technical overview of the proposed information management system. The functional specifications presented, along with the relevant entity-relationship diagrams, will provide a clear and concise illustration of the functions and services provided by the system. This overall concept assumes the following:

- That all evaluated divisions will have access to the ministry-wide Local Area Network (LAN).

- That the responsibilities of data maintenance and reporting will be clearly defined within the evaluated divisions and agencies.

Also outlined in this section is the overall systems architecture under which the proposed system will operate and support the relevant organisational units.

II.1   *Overview*

The information management system proposed is a macroeconomic database management system that will support the informatic requirements of the evaluated divisions and relevant agencies. This macro-economic database management system will allow key staff to have easy and timely access to all important national accounts, finance, monetary and other economic data. Some of the properties of this system are as follows:

- Standard Data Formats will be established for consistent data entry and retrieval of information.
- The information system will be designed to facilitate concurrent and remote access.
- Standard reports will be designed to be generated upon request or as selected (i.e. monthly, quarterly or end-of-year) An Ad Hoc Reporting utility with be implemented to facilitate individual requests.

The overall objective would be to implement an Information System that would allow the evaluated divisions to enter raw economic data on a monthly basis. From this system, standard reports can be generated and ad hoc reports can be built upon request. There would be no instances of divisions waiting for reports to be delivered. They will all be able to access required information individually and at will.

II.2.   *Architecture and Operating Environment*

The Macroeconomic Database Management System will comprise of many sub-systems, which will support the data requirements of the evaluated divisions.   This section outlines the proposed architecture, operating environment and the overall requirements under which this application must effectively operate.

Management

The data administration, maintenance and application support of the proposed system will be the responsibility of the MISU.   MISU will also coordinate the implementation of all modifications and enhancements, monitor performance and regulate and manage policies pertaining to data access and manipulation.

Networked (Multi-user) Access

The proposed application must be installed on a Local Area Network (LAN) so as to facilitate multi-user access. As part of the overall restructuring plan at the Ministry of Finance, the LAN currently in operation is now being extended to include the main building of the Ministry. The system can therefore reside on one of the file servers on the network and provide informatic support to the relevant divisions.

External Access
The following external entities should have access to the Macroeconomic Data Management System at the Ministry of Finance:

- Bank of Guyana
- Bureau of Statistics
- Inland Revenue Department
- Customs and Excise Department

The means of data communications to the Ministry of Finance have not yet been finalised. One of the primary reasons is that high performance data lines are not available from the local telecommunications provider. Over the short term however, dial-up connectivity via data modems is adequate for access. The following diagram outlines the technical environment under which the proposed system will operate.

Compatibility
- The system must run on the SQL Server database engine from Microsoft to store and process data on the server(s). This would be in keeping with the current direction of the MISU. This will also allow the MISU to make future modifications in-house if required.
- The server portion of the system will operate under the Windows NT Server networking operation system.
- The client portion of the system must be able to run under Windows 95/98 or Windows NT workstations.
- The client portion of the system must offer seamless integration with the Microsoft Office Suite.
- An Ad Hoc report writer must be available and should have capability to transfer data to third party software packages such as Excel, Microsoft Word, and other formats such as ASCII, etc.

Maintainability

- The system/applications should be fully century (i.e. Year 2000) compliant

- Applications should represent the latest version releases, complete with all updates and appropriate documentation.

Performance

- The system must be written as a client server application to distribute the processing of information between the workstations and the server.
- The system must implement stored procedures on the database.

Network Security

The system will require methods, procedures, and/or administrative tools, which will permit the MISU to monitor and control access to the application by unauthorised personnel. Given the fact the system will be accessed by external agencies, auditing capabilities must be developed to provide the MISU network administrator with the ability to detect unauthorised access.

Operating System Security

The system will require that its operating system (OS) have the capability of verifying all logins through a password protection mechanism. These capabilities include the ability to protect directories and/or files, the ability to enforce password change schedules, and the use of administrative tools to ease network administration overhead associated with OS-level security must be compatible with other levels of security to provide a manageable environment.

Database Enforced Security
The system requires that data security at the lowest level shall be enforced through the recommended MS SQL database engine.
Application Enforced Security

The system requires that data security at the application level will provide consistent and comprehensive means to protect data from unauthorised access view, modification or deletion. These protections should be User login dependent.

Applications should provide complete audit trail facilities for transactions, as well as integrity checks on manually entered information. Valid users should be defined in the system with the option for account expiration and password aging by the system.

Documentation

It is expected that the vendor(s) of the application and/or sub-system will provide full and comprehensive documentation for any operational procedures and functions implemented. Technical documentation for any customisation and/or modifications after deployment shall also be provided.

User documentation shall be available in hard copy, as well as on-line form. The User should be provided with a feature that will permit examination of all application features on-line.

Interfaces

The Macroeconomic Database Management System should interface with the core financial systems of the Ministry of Finance. The level of the interface to be developed will depend on the architecture of the financial system in existence. In the absence of the required architecture, import and file conversion can be developed to facilitate the exchange of information.

Data Volumes and Workloads

Data Volumes and workloads cannot be ascertained until final data requirements are established and guidelines are also established for the collection and dissemination of required information.

Hardware Requirements

The basic hardware requirements for the implementation of the proposed system are well within the established hardware specifications of the MISU at the Ministry of Finance. The MISU has to ensure and certify that the machines used for communications access at the external agencies meet the specified hardware requirements.

Network and Communication Requirements

Plans for the extension of the Local Area Network (LAN) currently in existence at the Ministry of Finance, which would include support all the divisions/units, will be implemented upon the completion of the repairs to the physical infrastructure currently in progress. This would have to be the basis on which the proposed system would be implemented.

Dial-up connectivity would have to be established for the external agencies. Overall, the nature of the data connectivity to the information systems at the Ministry of Finance has not been finalised. This appears to be primarily because of the inability, real or professed, of the national telecommunications provider (i.e. GT&T) to provide the high performance data lines required. In this instance, however, dial-up connectivity using normal phone lines can be configured and implemented.

Summary

The user interfaces provided in the proposed system line must provide easy access to all relevant information and reports with the least amount of keystrokes. Menus and Data entry/edit screens must be flexible and intuitive, requiring only the minimum amount of training necessary for day-to-day operations. Documentation help must be provided as an informative reference during day-to-day operations. Ad Hoc query utilities are provided so as to facilitate flexibility and accuracy in reporting. These reports can be generated either to the screen, printer or user defined text files. Extensive reference files are maintained so as to provide users with easy ways to access agency wide information.

II.3   *Users*

The following are the divisions and agencies that will use the proposed system to either input or access information.

- Debt Management Division
- Enterprise Monitoring Division
- Project Cycle Division
- Office of the Budget
- Macroeconomic Unit
- Bank of Guyana   (External Agency)
- Bureau of Statistics   (External Agency)
- Inland Revenue Dept.   (External Agency)
- Customs & Excise Dept. (External Agency)

II.4   *Definition of System Functions*

The following is an overview of the system functions required for the Macroeconomic Database Management System. These include the following:

II.4.1 Security Access Controls
- System Settings and Restrictions
- Establishment of User Profiles
- Security Levels Settings based users

II.4.2 Debt Management Data Maintenance
- Maintain and Update Debt Stock Information
- Maintain Bilateral and Multilateral Reference Information.
- Enter Monthly Disbursements and Debt Service Payments
- Update Debt Stock balances

- Generate Reports

II.4.3 Enterprise Monitoring Data Maintenance
- Maintain Public Corporations Listings
- Enter Monthly Financial Operations and Cash Flows
- Generate Reports

II.4.4 Project Cycle Data Maintenance
- Maintain Information on Projects (Pipeline & Execution)
- Enter Disbursement Information per project
- Derive Capital Expenditure per project
- Enter status reports on individual projects
- Generate Reports

II.4.5 Budget Office Data Maintenance
- Maintain Current Revenue Data by established categories
- Maintain Current Expenditure Data by established categories
- Enter Actual Revenue and Expenditure on a Monthly or Quarterly basis.
- Update Current Revenue Information
- Update Current Expenditure Information
- Generate Reports

The following diagram(s) illustrates a functional overview of the macroeconomic database management system. Also included are illustrations of the system functions and the sub-processes and databases supported. The conceptual network and communications design is also illustrated.

II.5   Data Requirements

This section of the document provides the base data requirements for the proposed Macroeconomic Data Management System. The brief overview of the concept of the information system will also be provided so as to establish a better understanding and appreciation of the proposed data tables and processes.

The data dictionary presents an outline of the proposed data elements for the databases. All tables within the data dictionary are presented under the organisational units that will have direct access to the databases within the proposed system.

Please note that the tables represent base requirements and are presented primarily for informative reference and guidance only. Final data definitions

would have to be established during the preliminary stages of system design and implementation and more importantly, after comprehensive discussions with all the proposed users.

Division/Unit: Debt Management Division

Mandate: This division is the central agency responsible for recording, monitoring and assisting with the management of all public and publicly guaranteed external debt (Central government, Bank of Guyana and parastatal debt)

The following tables illustrate the data elements proposed for this division

Table 1:   Debt Stock Information

Data Elements	Description
Identification Number	Unique Identifier for each Debt Record
Debtor Name	Name of Debtor (e.g. Central

	Government, Parastatal, Bank of Guyana
Classification	Type of Debt (whether Bilateral, Multilateral., Commercial Bank, Suppliers Credit)
Creditor Name	Name of Creditor (e.g. Donor Agency, Country, Private Corporation)
Balance ($Currency)	Debtor's Balance in selected Currency
Balance ($G)	Debtor's Balance in Guyana Dollars
Disbursement Date	Last Disbursement Date
Debt Service Payment	Last Debt Service Payment Date

Table 2:   Disbursement Information (Transaction Record)

Data Elements	Description
Identification Number	Unique Identifier for each Transaction (linked as a key field to Table 1)
Disbursement Date	Date of Actual Disbursement
Projected Amount	Projected amount Disbursed
Actual Amount	Actual Amount Disbursed
Details	All information relevant to the disbursement of the loan.

Table 3:   Debt Service Payments Information (Transaction Record)

Data Elements	Description
Identification Number	Unique Identifier for Transaction (linked as a key field to Table 1)
Payment Date	Date of Actual Payments
Projected Amount	Projected amount paid
Actual Amount	Actual Amount paid
Data Elements	Description
Details	All information relevant to the payment towards the loan.

Table 4:   Creditor Reference Information

Data Elements	Description
Name	Name of Creditor
Classification	Classification of Creditor i.e. Whether Multilateral, Bilateral, Private Creditors, Nationalisation, Bonds, etc.
Notes	Any relevant information about the Creditor (This is variable text field)

Notes

- During discussions the debt management division had indicated that the Debt Information System currently in use (CS-DRMS) has some limitations in terms of its reporting capabilities. The Debt Management Division must indicate clearly its level of satisfaction with CS-DRMS and whether it is going to be used over the long term.

Division/Unit: Project Cycle Division

Mandate: This division manages all donor-funded projects. Projects are monitored according to financing, compliance and overall progress.

The following tables illustrate the data elements proposed for this division

Table 1.   Project Profile Information

Data Elements	Description
Identification Number	Unique Identifier for each project

Agency Code Number	Executing Agency Code Number
Sector Code Number	Economic Sector Code Number
Rank	Overall rank based sectoral priorities and objectives criteria
Score	Overall Score based on sectoral priorities and objectives criteria
Title	Title of Project.
Classification	Level of need e.g. Critical
Region	Regions (1-10)
Agency	Executing Agency
Status	Current Status of Project (new or existing)
Duration	Planned Duration of Project
Description	Description of Project
Benefits	Benefits of the project and the jeopardy avoided.
Project cost	Total Project Cost
Previous Amount spent	Amount spent before current year (Foreign & Local)
Budgeted Amount	Amount budgeted for current year
Total Direct Foreign Expenditure	Total direct foreign expenditure by the executing agency. & Direct foreign expenditure by the executing agency.
Financing-Foreign	Total financing by foreign loans/grants
Financing-Central Government	Total amount to be financed by central government.
Financing-Local Agencies	Total amount to be financed by local agencies
Foreign Financing Source	Source of Foreign Financing
Central Government Source	Amount Financed by Central Government
Skilled Workers	Number of skilled workers to be employed
Data Elements	Description
Unskilled workers	Number of unskilled workers to be employed

Table 2:   Disbursement Information

Data Elements	Description
Identification Number.	Unique identifier for each project (linked as a key field to Table 1)
Disbursement Date	Date of all Disbursement
Amount Disbursed	Amount Disbursed for the project

Table 3:   Agency Reference Information

Data Elements	Description
Agency Code	Code Number assigned to the executing agency.
Name	Name of executing agency
Notes	Any relevant information pertaining to the executing agency. (this is a variable text field)

Table 4:   Economic Sector Reference Information

Data Elements	Description
Sector Code	Code Number assigned to the executing agency.
Name	Name of executing agency
Notes	Any relevant information pertaining to the executing agency. (this is a variable text field)

Notes:

- There is a Database Management System (DBMS) currently maintaining projects related information. Discussions with staff however, revealed that the system is slow, cumbersome, difficult to use and requires too many steps in order to generate required information. There is also currently no computerised information maintained on the activities of a project during execution. Serious consideration should be given therefore to the development of a comprehensive management system to support the informatic requirements of this division.

Division/Unit: Enterprise Monitoring Division

Mandate: This division monitors the performance of state-owned enterprises for the Ministry of Finance and the IMF. The information collected is primary financial operation and cash flows.

The following tables illustrate the data elements proposed for this division

Table 1.   Financial Operations Information

Data Elements	Description
Identification Number	Unique Identifier for each statement
Month/Year	Effective Month and Year of Financial Statement
Total Revenue	Total Revenue from Export Sales, Local Sales, Other Income etc.
Total Expenditure	Total Expenditure (i.e. Material and Supplies, Employment Costs, Depreciation, Local Interest, External Interest, Loss on Devaluation, etc.
Net Income after Taxation	Net Income =(Revenue-Expenditure)-Taxation
Source of Funds	Profit before Taxation, Equity, Disposal of Fixed Assets, Depreciation etc.
Application of Funds	Taxation Paid, Dividend Paid, Capital Expenditure, Working Capital, etc.
Working Capital	Increase/Decrease in Stock, Increase/Decrease in Debtors, Increase/Decrease in Treasury Bills, Increase/Decrease Cash and Bank balances
Debtors/Creditors	Local Debtors, Foreign Debtors, Increase/Decrease Cash and Bank balances, Govt. Sec., External Borrowings

Table 2:   Cash Flow Information

Data Elements	Description
Identification Number.	Unique identifier for each statement (linked as a key field to Table 1)
Receipts from operations	Cash Sales (Local & Foreign) Debtors Receipts (Local & Foreign)
Cash Flow Application	Materials & Supplies, Employment

	Cost, Capital Expenditure, Loan Repayment (Local & Foreign), Payments Creditors, Dividends
Receipts – Other Sources	External & Foreign Loans

Division/Unit: The Office of the Budget

Mandate: This division manages the public finances through preparing annual estimates of revenue and expenditure for National Assembly approval, and monitoring such revenue and expenditure through the fiscal year.

The following table illustrates the data elements proposed for this division

Table 1.   Current Revenue Information

Data Elements	Description
Total Tax Revenue	Total Values from: Income Tax: companies, personal, Self-employed, Withholding tax, Other
Total Non-Tax Revenue	Total Values from: Rent, Royalties, Land Development
Other-Current Revenues	Total Values from: Dividends from public corporations, Bank of Guyana Profits, Land Development scheme etc.
Total Statutory Expenditure	Total Values from: Wages and Salaries, Employment overhead expenses, Pensions & Gratuities.
Total Appropriation Expenditure	Total Values from: Administrative, Senior Technical, Clerical and Office support, Other employees
Total Public Debt	Total Values from:Internal Principal, Internal Interest, External Principal, External Interest.

Notes:

- The development of databases and system modules for the Office of the Budget would depend heavily upon the acquisition of the Integrated Budget and Accounting System (IBAS). If IBAS is deployed, the majority of information required, in summary or detail, would be available through that system. All that would be needed within the proposed Macroeconomic Database Management System is a data interface utility to access data maintained by IBAS.

Division/Unit: The Macroeconomic Unit

Mandate: This unit provides economic analysis and research for the Ministry of Finance.

Recommendation/Notes:

The Macroeconomic Unit will not be a repository for the storage and maintenance of information. The primary function of this unit is to extract and manipulate existing data from the evaluated divisions and external agencies for its research, analysis and policy objectives for the Ministry of Finance.

SECTION III.   IMPLEMENTATION

This section outlines the proposed schedule of implementation of the Macroeconomic Management Database System. Also discussed in this section is the staff required to implement this system and the associated costs.

III.1   *Implementation Schedule*

The following is the proposed schedule of implementation of the Macroeconomic Database System:

Activity	Objective(s)	Duration
1. Data Definition	To meet with all relevant staff to establish an understanding of and concurrence with the proposed data tables, elements, database schema, and data entry screens	10 days
2. Creation of Databases and Data Entry Screens	To build and test all databases and data entry screen required for the proposed system	10 days
3. The Development of system modules	To develop the core processes of the Macroeconomic Database	35 days

for data access and reporting	Mgmt. System	
4. Installing and testing of system	Product Completion and Successful installation of system	5 Days
5. Staff Training	To ensure that staff have a working and administrative knowledge of all aspects of the new system	15 days
6. Provision of System Documentation and User Manuals	Staff must have an easy and informatic reference available for day-to-day operations	5 days
7. Delivery of system for management acceptance		

Notes:

- The data entry process begins at the end of Activity (2). The objective is to reduce the backlog data as much and as quickly as possible

- Activity (2) and (3) start almost simultaneously-therefore reducing the implementation period.

- Activity (5) and (6) start almost simultaneously-therefore reducing the implementation period.

III.2   Project Staffing:

The proposed staff requirements for the implementation of the Macroeconomic Database Management System is as follows:

- One (1) Programmer/Analyst (will also server as project manager)
- One (1) Programmer
- One (1) Programmer/Analyst (Local or in-house Counterpart)
- One (1) Documentation Specialist
- One (1) Trainer

III.3   Preliminary Costs:

Please note that the pricing submitted are preliminary estimates: It should also be noted that the pricing is based primarily on the base solutions proposed in this document. The pricing therefore might subject to some

adjustments depending on the final system requirements for the proposed application.

Design, Development and Implementation of a Macroeconomic Database Management System

Cost: US$8,000.00

SECTION IV: FEASIBILITY

This section provides an analysis of the feasibility of implementing the Macroeconomic Data Management System.

Alternatives Considered
Since the overall intent is that the implementation and operation of the proposed system must be compatible with the direction and the system guidelines established by the MISU, alternatives as they pertain to the operating environment and the general system requirements were not considered.

The one concept that was considered was the development of an application that would operated in an internet/intranet environment. The advantage of this is that it would be easier to facilitate and also expand usage as required, since the internet as a communication medium is now familiar to most people. This solution however would generate additional overheads and workloads, which might not be readily absorbed by the MISU or the Ministry of Finance as a whole.

Implementation Requirements

The successful implementation of the Macroeconomic Database Management System would depend on many factors. Some of which are as follows:

- The effective determination and implementation of adequate pace and levels of training, support and knowledge transfer levels with system users and MIS personnel
- The Provision of additional human resources (if required) to ensure an effective implementation of the system.
- The ability to 'market' the proposed system to the potential users.
- The establishment of rules and regulations pertaining to the production of standard inputs and outputs within the selected divisions/units.

Implementation Risks

Key project implementation risks include the following:

- Inadequate MOF senior level project sponsorship
- Competing agendas
- Inadequate user training for, and support during, system implementation
- Low technology absorption rates by system users
- High staff turnover/migration rates during implementation
- Implementation flexibility

Conclusion

It is important that the Ministry of Finance understands clearly that the process of computerisation must be participatory. The centralised computerisation of macroeconomic data represents a fundamental shift in operations that will impact both staff and systems. As such it requires the involvement, understanding and commitment of all concerned. With this in mind, it is important to note the following:

- It is imperative that there is consensus among the relevant staff on the nature of the system, there must be absolute agreement on the data elements for the tables, formats for data screens, the role of the external agencies and other details.

- Responsibilities for the input of monthly, quarterly data into the system must be clearly defined. Those information sources identified must develop an appreciation for the timeliness of information and the discipline to input it.

- There must be a clear understanding and appreciation of the role of macroeconomic information within the Ministry of Finance.

- Functional capacity must be strengthened. Using high-end management information systems is a fundamental and intellectual shift from word-processing and spreadsheet packages.

The implementation of this system, if approved, will not be without teething problems. The Ministry of Finance is not unlike other agencies with its weaknesses in technical skills in many key areas.   What ultimately will sustain this project is the commitment of the decision-makers within the Ministry of Finance.

ANNEX A

Persons Interviewed

Dr. Coby Frimpong,	Macroeconomic Unit, Ministry of Finance
Ms. Rachel Andrade	MISU, Ministry of Finance
Mr Reginald Ross	MISU, Ministry of Finance
Ms. Donna Yearwood Finance	Debt Management Division, Min. of
Ms. Kathy Jackman Finance	Enterprise Monitoring Division, Min. of
Mr. Winston Jordan	Office of the Budget, Min. of Finance
Mr. Tarachand Balgobin	Project Cycle Division, Min. of Finance
Mrs. Priya Warslie	Project Cycle Division, Min. of Finance
Mr. M. Sealy	Project Cycle Division, Min. of Finance
Mr. Lennox Benjamin	Bureau of Statistics
Mr. Iqram Alli	Customs & Excise Department
Mr. M. Harris	Research Division, Bank of Guyana
Mr. Linden Morrison	Accounts Division, Bank of Guyana

ANNEX B

The following is the preliminary information provided to the BEEP project during the execution of the required tasks.

To: Dr. Coby Frimpong, Chief-of-Party, BEEP Project
                Ms. Margo Singh, Senior Project Coordinator, BEEP Project

From: Lance N. Hinds, Computer Systems Consultant, BEEP Project

Subject: Overview of Scope of Work, Work Plan and activities to date

Date: June 19, 1998

OVERVIEW OF SCOPE OF WORK

During the first meeting with the Chief of Party and Senior Projects Coordinator on Wednesday June 10, 1998, the Chief of Party instructed that the Information Technology Plan be developed <u>only</u> for the following divisions within the Ministry of Finance:

- Macroeconomic Division
- Office of the Budget
- Project Cycle Division
- Enterprise Monitoring
- Debt Management Division

Specifically, the requirement is to analyze the above mentioned offices/divisions to ascertain the following:

- The information collected and maintained by each division.
- The reports generated by each division
- The informatic capacity of each division

- The data linkages between each division and externally, the Bank of Guyana, The Statistical Bureau, Customs and Excise Department and the Inland Revenue Department.

The objective of this exercise is to formalize the data requirements and related linkages and to develop the overall concept of a Management Information System to satisfy the informatic needs of the selected divisions.

This requirement does not deviate from the Scope of Work in the Terms of Reference. It must be clearly understood however that the specific deliverables as stated in the Terms of Reference (i.e. The Information Needs Identification, System Architecture Proposal and Implementation Plan) will pertain only to the informatic requirements of the selected divisions.

WORK PLAN

The work plan will be executed within the following phases:

Phases	Objective(s)	Completion By
1. Meeting with Division heads and relevant staff.	To examine all data collected, maintained and generated by each division.	June 26th , 1998
2. Preparation of Preliminary Information Requirements Analysis	To develop the initial concept(s) of the informatic needs of each division.	July 3rd, 1998
3. Second round of meetings with division heads and relevant staff	To discuss the preliminary requirements so as to establish a clear understanding of the concepts proposed and the general concurrence with these concepts	July 10th, 1998
4. Development of proposal for Information Technology Plan	To develop an information needs analysis, system architecture proposal and implementation plan for review and acceptance by the Ministry of Finance.	July 17th, 1998

ACTVITIES TO DATE

Contact has been made with the following divisions and related staff:

- Mr. Tarachand Balgobin   Project Cycle Division
- Ms. Priya Warslie   Project Cycle Division/Project Cycle Division
- Ms. Donna Yearwood   Debt Management Division
- Mr. Winston Jordan   Office of the Budget

Meetings were conducted so as to ascertain the following:

- The nature of information collected and maintained by the respective divisions
- The source of the information
- The nature and format the reports generated by each division
- The nature of the information shared between the selected divisions

ACCOMPLISHMENTS

All meetings to date have been productive. In all instances, numerous sample reports and/or raw data formats have been provided for analysis. A meeting was also held with Ms. Rachel Andrade, Manager, Management Information Systems Unit (MISU). This was to obtain a perspective on the current and future infomatic capacity of the selected divisions slated for the Information Technology plan.

PRELIMINARY DATA REQUIREMENTS REPORT
July 1998

Prepared by:
Lance N. Hinds
Computer Systems Consultant
July 8,1998

INTRODUCTION

This document is the product of a series of discussions and observations concerning the first phase of the development of an Information Technology plan for selected divisions/units within the Ministry of Finance. The analysis provided in this document provides the initial data requirements for the design, development and implementation of a Macroeconomic Data Management system. Please note that this is a preliminary document and therefore the solutions proposed therein are still subject to the understanding and concurrence of all relevant division staff during the verification phases of the data requirements requirement phase.
Technology plan?

Background

The Ministry of Finance, in co-operation with The Building Equity and Economic Participation (BEEP) project has undertaken the development of the Information Technology strategic plan to streamline the informatic processes of the Ministry of Finance. Specifically, the plan is to be developed for the following division/units:

- Macroeconomic Division
- Office of the Budget
- Project Cycle Division
- Enterprise Monitoring
- Debt Management Division

Specifically, the requirement is to analyze the above mentioned offices/divisions to ascertain the following:

- The information collected and maintained by each division.
- The reports generated by each division
- The informatic capacity of each division
- The data linkages between each division and externally, the Bank of Guyana The Statistical Bureau, Customs and Excise Department and the Inland Revenue Department.

The objective of this exercise is to formalize the data requirements and related linkages and to develop the overall concept of a Macroeconomic Data Management System to satisfy the informatic needs of the selected divisions. The system architecture to support the information system and the plan of implementation is to be developed.

This document therefore outlines the following:

Data Requirements: *identifies all data inputs and outputs required by each division plan*

This document is targeted at managers. Knowledge of computer systems, while helpful, is not a prerequisite.

SECTION I: Data Requirements

This section of the document provides the preliminary data requirements for the proposed Macroeconomic Data Management System. The brief overview of the concept of the information system will also be provided so as to establish a better understanding and appreciation of the proposed data tables and processes.

1.1   Concept of Macroeconomic Data Management System

Discussions and observations during the first phase of the development of Information Technology plan clearly indicate that the selected divisions and external agencies generate a substantial amount of information. These entities provide this information to each other either by request or on a scheduled basis. This method of data management is simply not sustainable over the long term. The some of the reasons are as follows:

- All data is localised within the individual divisions/agencies. The overall informatic capacity is therefore reduced because data resides in too many different locations.
- There are no standard data formats or guidelines for data storage.
- Every division would have individual views on timeliness and accuracy. This sometimes results in the perception real or imagined that the provision of data is either late or in some cases inaccurate.
- Dissatisfaction with data provided may cause some entities to locate other data sources thus compromising established data collection procedures.

It is with these concerns in mind that it is proposed that a Macroeconomic Data Management System be developed. Some of the properties of this system will be as follows.

- All data will be stored in databases on File Servers. These file servers will be accessible over a Local Area Network. (LAN).
- Standard Data Formats will be established for consistent data entry and retrieval of information.
- The information system will be designed to facilitate concurrent and remote access.
- Standard reports will be designed to be generated upon request or per selected (i.e. monthly quarterly, end-of-year) An Ad Hoc Reporting utility with be implemented to facilitate individual requests.

The overall objective would be to implement an Information System that would allow the selected divisions to enter raw economic data on a monthly basis. From this data, standard reports can be generated and ad hoc reports can build upon request. There would be no instance of divisions waiting for reports to be delivered. They will be able to access all required information themselves.

The data dictionary presents an outline of the proposed attributes for the databases. Please note that the tables presented are not final and are presented primarily for informative reference and guidance only.

Division/Unit: Debt Management Division

Mandate: This division is the central agency responsible for recording, monitoring and assisting with the management of all public and publicly guaranteed external debt (Central government, Bank of Guyana and parastatal debt)

The following table illustrates the attributes proposed for this division

Table 1: Debt Stock Information

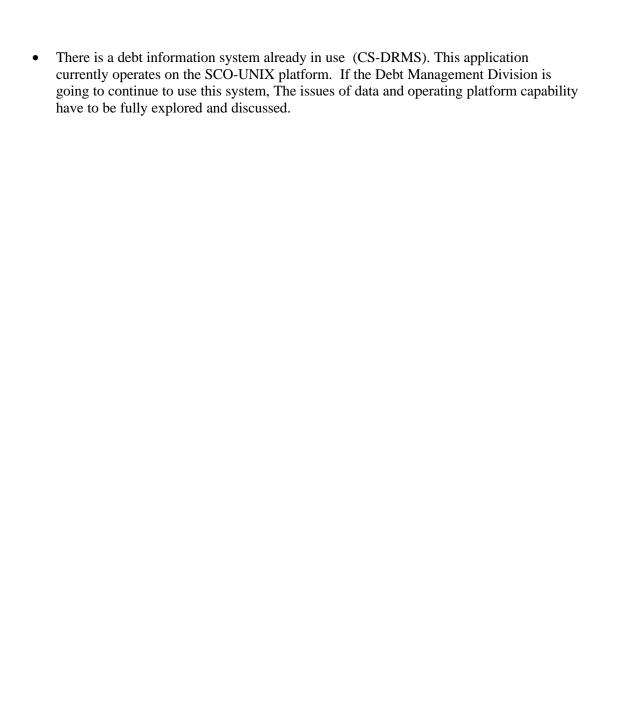| Attributes	Description
Identification Number	Unique Identifier for each Debt Record
Debtor Name	Name of Debtor (e.g. Central Government, Parastatal, Bank of Guyana
Classification	Type of Debt (whether Bilateral, Multilateral., Commercial Bank, Suppliers Credit)
Creditor Name	Name of Creditor (e.g. Donor Agency, Country, Private Corporation)
Balance ($US)	Debtor's Balance in US Dollars
Balance ($G)	Debtor's Balance in Guyana Dollars
Disbursement Date	Last Disbursement Date
Debt Service Payment	Last Debt Service Payment Date

Table 2: Disbursement Information (Transaction Record)

Attributes	Description
Identification Number	Unique Identifier for Transaction (linked as a key field to Table 1)
Disbursement Date	Date of Actual Disbursement
Projected Amount	Projected amount Disbursed
Actual Amount	Actual Amount Disbursed
Details	All information relevant to the disbursement of the loan.

Table 3: Debt Service Payments Information (Transaction Record)

Attributes	Description
Identification Number	Unique Identifier for Transaction (linked as a key field to Table 1)
Payment Date	Date of Actual Payments
Projected Amount	Projected amount paid
Actual Amount	Actual Amount paid
Details	All information relevant to the payment towards the loan.

Recommendations/Notes:

- Providing remote access is facilitated, The Bank of Guyana can be input data directly in Tables 2 and 3 (i.e. Actual amounts disbursed and/or paid).

- There is a debt information system already in use (CS-DRMS). This application currently operates on the SCO-UNIX platform. If the Debt Management Division is going to continue to use this system, The issues of data and operating platform capability have to be fully explored and discussed.

Division/Unit: Project Cycle Division

Mandate: This division manages all donor-funded projects. Projects are monitored according to financing, compliance and overall progress.

The following tables illustrates the attributes proposed for this division

Table 1.   Financial Operations Information

Attributes	Description
Identification Number	Unique Identifier for each project
Agency Code Number	Executing Agency Code Number
Sector Code Number	Economic Sector Code Number
Rank	Overall rank based sectoral priorities and objectives criteria
Score	Overall Score based on sectoral priorities and objectives criteria
Title	Title of Project.
Classification	Level of need e.g. Critical
Region	Regions (1-10)
Agency	Executing Agency
Status	Current Status of Project (new or existing)
Duration	Planned Duration of Project
Description	Description of Project
Benefits	Benefits of the project and the jeopardy avoided.
Project cost	Total Project Cost
Previous Amount spent	Amount spent before current year (Foreign & Local)
Budgeted Amount	Amount budgeted for current year
Total Direct Foreign Expenditure	Total direct foreign expenditure by the executing agency. & Direct foreign expenditure by the executing agency.
Financing-Foreign	Total financing by foreign loans/grants
Financing-Central Government	Total amount to be financed by central government.
Financing-Local Agencies	Total amount to be financed by local agencies
Foreign Financing Source	Source of Foreign Financing
Central Government Source	Amount Financed by Central Government
Skilled Workers	Number of skilled workers to be employed
Unskilled workers	Number of unskilled workers to be employed

Table 2: Disbursement Information

Attributes	Description
Identification Number.	Unique identifier for each project (linked as a key field to Table 1)
Disbursement Date	Date of all Disbursement
Amount Disbursed	Amount Disbursed for the project

Recommendation/Notes:

- There is a project management database in currently operation in the project cycle division. Discussions with staff and an independent evaluation indicated however that it is not user-friendly and information is not easily accessible.

- There is currently no computerised information maintained on the activities of a project during execution. It is recommended that this be implemented so as to provide a complete project profile.